

Circular Voided Concrete Floors

for Grain Drying & Vegetable Store Ventilation

Introduction

The traditional above floor lateral ducting systems which gained popularity in the 50's and 60's have served the agricultural industry well. However, they have been shown to have a number of major disadvantages, mostly associated with access for bulk loading, and air distribution. The introduction of drive-over floors has tackled these problems and offered unfettered access and more even air distribution. Early designs have been refined to give, what are now, highly efficient and practical drying systems.

One innovative solution that has gained popularity over the last 12 years has been the development of the circular voided concrete floor which has been shown to provide a particularly robust and effective air handling system.

Problems with early drive-over floor designs

Many early drive-over floor designs were based on casting 300mm duct channels at 1m spacing across the floor. Although solving access problems, many of these floors were limited in their air handling abilities. They were also costly because of the need for shuttering systems during casting, and the use of reinforced ventilated sections for load-bearing.

Refined flooring design

The incorporation of a ducting systems with closer spaced narrow covers has been developed to give better air distribution. Wider air dispersion across the floor has meant that deep lateral ducts are no longer needed and the floor

can now be laid without deep excavation and shuttering.

The floor is constructed by casting concrete around a series of inflated circular section tubes to form the lateral ducts. When the concrete has set the tubes are withdrawn and perforated mesh strips are fitted to allow the air up through the floor into the crop. This flooring system can be cast onto a consolidated hard-core base or onto an existing concrete floor.

Features of the system are as follows:

- Narrow spaced outlets allow uniform airflow even at shallow drying depths - they are also much less prone to damage compared with wide duct covers or above floor lateral ducts.
- Large cross sectional area of the ducts and the smooth duct surfaces limit back-pressure on the fan. This keeps airflow to a maximum in any given operating condition.
- Wide floor areas can be ventilated without the need for multiple main air ducts. 18m floor widths have been demonstrated to work effectively.
- Durable floors - the concrete gives a tough long lasting floor and duct inserts can be removed for cleaning
- Can be professionally installed or done as a DIY project.

Construction details

New drying floors can be cast onto a hard-core base or an existing concrete floor. Total depth of the drying floor is between 200 and

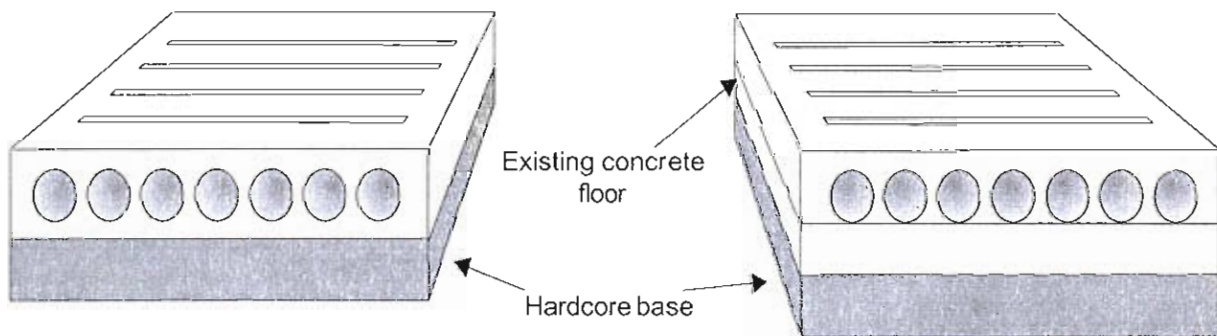


250mm thick depending on the construction details. Void diameters for most applications are 150mm although larger cross sections can be cast for high airflow applications where wide floors are required (e.g. onion drying with 18m wide floors.)

Performance details

A number of technical assessments have been carried out by ADAS for companies who sell these floors. Specifically, results for the GFT flooring show good air distribution and low pressure drops through

the system. Typically, for a store filled to 2.5m and having a duct length of 9m, pressure drop through the floor and ducts accounts for under 30% of total pressure development. This represents good performance (badly designed or blocked floors may account for over 60% of resistance against which the fan has to deliver air).



Floor cast directly onto hardcore base

Floor cast onto an existing granary floor